

## CLAIMS

1. A method for distinguishing between metal objects, comprising the steps of:

interrogating a target with at least two frequencies;

5 receiving respective electrical response signals from said target for at least said two frequencies;

resolving said response signals into respective portions that are at least primarily resistive;

comparing the magnitudes of at least two of said portions;

10 selecting one response signal from among said response signals based on the results of said step of comparing; and

characterizing said target by use of said one response signal.
2. The method of claim 1, wherein said step of selecting selects said one response signal based on whether the respective said portion of said one response signal is

larger in magnitude than the respective said portion of another of said response signals.

3. The method of claim 1, wherein said step of selecting selects said one response signal based on whether the respective said portion of said one response signal is larger in magnitude than the respective said portion of all other of said response signals.

5 4. An apparatus for distinguishing between metal objects, comprising:

an interrogating circuit adapted to interrogate a target with at least two frequencies;

a receiving circuit adapted to receive respective electrical response signals from said target for at least said two frequencies;

10 a demodulating circuit for resolving said response signals into respective portions that are at least primarily resistive;

a comparing circuit for comparing the magnitudes of said portions;  
and

15 a selecting circuit for selecting one response signal from among said response signals based on said comparison.

5. The apparatus of claim 4, further comprising a look-up table for characterizing said target with said one response signal.

6. The apparatus of claim 4, wherein said demodulator circuit includes at least two synchronous demodulators associated respectively with said first and second frequencies.

7. The apparatus of claim 6, wherein said demodulator circuit includes at least four synchronous demodulators associated respectively with the resistive and reactive components for each of said first and second frequencies.

8. A method for distinguishing between metal objects, comprising the steps of:

interrogating an actual target with one or more electromagnetic signals at at least first and second frequencies;

receiving respective first and second electrical response signals from said target associated with said first and second frequencies;

obtaining first data from said first electrical response signal data;

normalizing said first data with respect to predetermined reference  
data at a third frequency; and

comparing the normalized said data corresponding to said first  
response signal to data corresponding to said second  
response signal; and

providing a signal responsive to the results of said step of  
comparing.

9. The method of claim 8, wherein said third frequency is equal to said second  
frequency.

10. The method of claim 8, wherein said third frequency is not equal to said  
second frequency, the method further comprising normalizing the said data corresponding  
to said second response signal with respect to said predetermined reference data, and  
wherein said step of comparing includes comparing the normalized said data  
corresponding to said first response signal to the normalized said data corresponding to  
said second response signal.

11. The method of claim 8, further comprising providing an output audio  
representative of the magnitude of at least one of said first and second response signals,

and decreasing said audio output as a function of said signal.

12. A method for correlating one or more of a metal detector's response signals to reference data that relates a plurality of metal targets to selected signal characteristics, the method comprising the steps of:

5                   interrogating the metal target with an electromagnetic signal at a first frequency to obtain a corresponding response signal;

                  identifying in said response signal a selected signal characteristic;

                  normalizing the identified said signal characteristic with respect to said reference data; and

10                   comparing the normalized said signal characteristic with the signal characteristics of said reference data to identify the metal target.

13. The method of claim 12, wherein said signal characteristic is a phase delay between the interrogating signal and said response signal.